Towards a Minimum Discourse Grammar for ESP Reading Courses

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A description is given of research being carried out within the context of the Brazilian National ESP Project. This Project, supported by the Brazilian Ministry of Education, The British Council, and the UK Overseas Development Administration, aims to bring Brazilian university and technical college students to a point where they can "cope" with the sort of texts they have to read in English in their own disciplines. Having defined the term Minimum Discourse Grammar, the paper surveys the aims and purposes of science as expressed by three well-known scientific philosophers. This deductive procedure for establishing a Minimum Discourse Grammar is followed by an inductive one, with a summary of the findings of a reading miscue study carried out among Brazilian teachers and students engaged in the Brazilian ESP Project. The third input to the Grammar is elements of a comparison between scientific language in English and Portuguese.

BACKGROUND TO THE RESEARCH

The term "coping strategies" was coined by my colleague, Mike Scott, in view of the very short courses which our students normally have in English; 45 to 100 hours (plus a rudimentary smattering of English from their secondary education) allows teachers and students time to do little more than 'cope' with a text as best as possible.

Previous to 1980 this short course duration had, we considered, been used somewhat ineffectively in the 23 universities where the Project operates. Most of the teaching had been very much language-orientated: texts had been used to illustrate, and exercises designed to activate, such topics as familiarity with the passive voice, verb tenses, morphology, and other features of the scientific and technical registers.

As the Project entered its present phase with the arrival of three British Council visiting lecturers/itinerant teacher-trainers, we introduced the teachers concerned with the courses to the notion of developing reading strategies rather than language proficiency. Thus "prediction", "key-words", "skimming", "scanning" and so on became watchwords of Brazilian ESP teaching.

This was a healthy correction, but as we are so well accustomed to in language teaching, the pendulum began to swing back, and requests for guidance on teaching language items within this reading-strategy framework began to filter back from the classroom teachers.

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It was from this that arose the idea of devising a "Minimum Discourse Grammar":

> *Minimum* because, as already mentioned above, the courses we are concerned with are extremely short. The grammar items listed will need to be highly selective.
>
> *Discourse* rather than text, because the sort of items we are after reflect the text as part of an interactive reading process, where such criteria as author intentions, previous knowledge and reading purpose are relevant.
>
> *Grammar* in the sense of a pedagogical grammar: a suggested list of language items derived from the principles and constraints mentioned above and to be developed in this paper. ESP teachers may then select from this list according to their assessment of the needs and interests of their students.

The following sections enlarge upon the principles and methods which underlie the establishment of such a Minimum Discourse Grammar, but of course represent only an interim view of our findings so far.

The principles will be presented from the most abstract to the most concrete, from concern with the aims and purposes of science, through the aims of our particular courses — i.e. reading — to a comparison between scientific language in English and Portuguese. These represent deductive, inductive and analytical procedures for arriving at our grammar.

THE AIMS AND PURPOSES OF SCIENCE

The views of three writers on science will be developed in this section. Given these views, then certain language items become candidates for inclusion in our grammar.

Rom Harré In his book *The Logic of the Sciences* (1960), Harré includes a chapter on "The Aims and Methods of Science", where he throws in his lot with ".... the tradition of those who believe that some scientific theories do successfully and legitimately go beyond experience to reveal the unobservable by acts of thought." (p.40). Harré is here referring to the importance of deductive and inductive reasoning in science, and the rest of his book is largely dedicated to the nature of these reasoning processes.

This relationship between science and reason suggests a view of scientific discourse as logical in structure and content. Causal and logical relationships between propositions will be expressed through such linguistic forms as *if... then; given that... then; so, thus, however; the fact that...*

The following text from the *New Scientist* — typical of the sort of material we include in our courses — shows how important such logical connectors (italicized) can be in unravelling a complex argument.

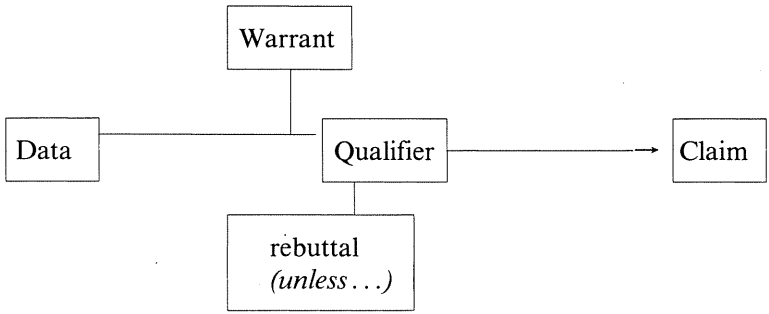
> Theories of how evolution proceeded in the stages leading up to life (prebiosis) are necessarily shaped by the disadvantage that we can see the end of the process *but* we cannot see the beginning and intermediate stages. *Thus* theories of prebiotic evolution are unusually speculative. *However,* it is so unlikely that the contemporary biosphere arose entirely by chance that, *if* we could show that, *given* reasonable assumptions, a particular sequence of chemical and physical processes led to life as it is now, *then* our assumptions would be "proven". (*New Scientist,* 15.1.81, p.153).

In reading this sort of text the student needs to keep his head, since heavy embedding occurs as conditions and constraints are put on the main propositions. The student is helped if he makes sure he can understand what is related to what through the conjunctions.

The conjunctions themselves are supported by further text and grammatical features contributing to lexical cohesion. Thus he may recognise that:

- "Theories how evolution proceeded in the stages leading up to life (prebiosis)" and "... theories of prebiotic evolution" are synonymous, provided he spots the noun/adjective morphology: -iosis/-iotic.
- The verb/noun derivational forms *proceed/process* will also help him.
- Hyponymy highlights the *but* in line 3 where contrasts are made between types of stages: ... *end* ... *but* ... *not* ... *beginning.*
- The antonymy in ... *by chance/chemical and physical processes* ... is also a subtle semantic clue to understanding the text.

Stephen Toulmin Toulmin's (1983) views on argumentation in science are more concerned with the semantic status of discourse content than with formal markers of development. For Toulmin, arguments consist of claims, grounds, warrants, rebuttals and qualifiers. The valid argument will substantiate a claim on the basis of factual data, and will be supported explicitly or implicitly by well-established 'laws of nature' principles, formulae, which serve as 'warrants'. Thus, following Toulmin's schematization we have:



On the simplest basis, given Galileo's formula for falling bodies as a warrant, we can make a claim about a particular fall provided we have data concerning weight, height, etc., and given that there are no unforeseen circumstances; but more complicated arguments (e.g. Darwin's theory of evolution) can also be thus analysed.

A useful way to help students through scientific or technical argument is to ask them first to identify the claim that the author is making. A further step on the road to critical reading is then to evaluate the data adduced by the author to substantiate his claim.

As stated above, these are largely semantic aspects of discourse. Specific linguistic items are, however, involved in Toulmin's concept of the qualifier. The qualifier is the exponent of the scientific writer hedging his bets just in case a valid rebuttal condition should emerge. Scientific writers therefore rarely make outright or "strong" claims, but use qualifying phrases such as *It seems that . . . , Our findings suggest that . . . , This may indicate that . . .* Adverbs such as *possibly* or *probably* may also function as qualifiers.

Karl Popper To contrast his own views with the 'positivist' view of science, Popper describes himself as a 'negativist' and writes:

> You will have noticed from the formulation that it is not the accumulation of observations which I have in mind when I speak of the growth of scientific knowledge, but the repeated overthrow of scientific theories and their replacement by better ones. *(The Growth of Scientific Knowledge* 1979:7)

From this we may deduce that markers of contrast will be important to the understanding of scientific discourse, as past theories are questioned and new categories of description are established.

Elsewhere (Deyes 1985) I have distinguished two main types of contrast in scientific writing which I have termed inter-discoursal and intra-discoursal contrasts. By interdiscoursal I refer to critical evaluation of past research, which frequently occurs — as Swales (1981) has pointed out — in the intraduction section of scientific articles. This is likely to involve the semantics of negation, not only in its most formal manifestation through the negative particle, but lexically as well through terms such as *deficiency, error, gap, problem, unsatisfactory, ineffective* and so on. Hoey's (1983) discussion of discourse structure from a problem/solution point of view examines such features in depth.

Earlier categories of description will then, perhaps, need to be revised by the scientific writer and new ones set up. This may well be achieved through intra-discoursal contrasts — the matching of one phenomenon or concept against another. This refinement or 'replacement' will often find its expression in noun

group modification where the head word will be the concept concerned and the modification will express types or allomorphs of that central concept. We shall say more of this below.

Popper's use of the words *better ones* also clearly predicts the occurrence of explicit comparative forms as a feature of scientific discourse.

To sum up this section, then, it may be said that the various aims of science described by the three writers — the reality probably approximating to a combination of all three — indicate the probable need to include the following items in our Minimum Discourse Grammar:

- Conjunctions and logical connectors
- Morphological markers of word-classes
- Semantic relations of hyponymy and synonymy as aspects of lexical cohesion
- 'Qualifying' verbs, adverbs and modals
- Markers of negation and 'problems'
- Contrasting noun group modification
- Comparative forms

READING MISCUES

With, in this section, the statements received from students and teachers on specific reading difficulties we pass to a more inductive approach to the establishment of our grammar, and to a more bottom-up view of the reading process. As part of our study, teachers, and students through their teachers, were asked to "pick one sentence, where during your reading of an English text, you had to stop, go back and re-read it since it didn't seem to make sense. Try and identify what caused the difficulty."

Teachers were naturally more able to help on the second part of this instruction than were the students. In the analyses below we pick out the more recurrent problems, with examples and explanations.

Reference Items

> . . . and the gift of Orton's characters for intricate and inventive euphemism, so far from toning down the outrageousness of their actions and ideas, only places *it* in even stronger relief.

The reader here saw two candidates for the reference of *it*: *euphemism* and *outrageousness* and favoured the first, as it is final in its noun group rather than

post-modified by further nouns. He would have been helped to correctly identify *outrageousness* as the correct reference if he had been able to follow the contrastive syntactic parallelism of *far from toning down X . . . only places X in stronger relief.*

One student mentioned problems with substitution items referring back to numbers and dates; the example quoted was:

> . . . which was played in Dublin by the Abbey Theatre and also in London in March 1904 where they were well received. Some months earlier at Dublin's new Abbey Theatre the Irish National Theatre had produced his third play.

This, like the earlier text, came from a student of English literature who said that she was confused by the chronological sequence and had to go back and look at the date. Two things seem of interest here. First of all, texts do not always follow the chronological order of events. Secondly, could it be that students — particularly of literature, perhaps — skip over figures or, at least, dates, until they are found to be significant, and then have to go back and re-read (much as we tend to skip over complicated names in Russian novels!)?

The third example under 'reference' is an extreme one, but serves to illustrate unforeseen language-specific problems our students (or, in this case, a teacher) might have. From an article on Henry VIII's warship *The Mary Rose* comes this rather amusing confusion:

> Margaret Rule, archeological director of the Mary Rose Trust, reports some of the most exciting discoveries made about this great warship and why *she* went down.

As the article goes on to mention that Margaret Rule did, in fact, make several dives, the reader is to some extent justified in wondering whether *she* refers to *The Mary Rose* or to Margaret Rule!

—ing Items

While one student was "surprised to find a verb form ending in *-ing* but could not find the verb *to be* in front of it"— a hangover from extensive drilling in the present continuous during his secondary-school days, perhaps — more generalisable problems with *-ing* did occur. The following sentence, even in its context, remains ambiguous:

> They believe that *developing* potential will help children become happier and more fulfilled adults.

though perhaps a verbal noun + object interpretation is preferred to an adjectival one.

A confusion between *-ed* and *-ing* forms arose in the following example:

> ... nor is it difficult to think of things to talk about in class *providing* intake via meaningful communication activities.

This reader of Applied Linguistics texts expected a subordinate verb after *activities* instead of a sentence end, since she had construed *providing* as the conditional conjunction *provided (that)* (a confusion which may also be taking place among native-speakers?)

This leads into further clause relationship examples.

Other Misreadings of Subordination

Miscues by near-native-fluency speakers highlight what are likely to be even greater problems for less proficient readers. A leading member of the ESP Project team had to re-read the following sentence from the Harré book already quoted:

> ... by applying the rules of logic approach to the sort of axioms we have any specific items of information can be deduced.

Perhaps this can best be explained by comparison with a miscue from another reader:

> When unmethylated, regions of DNA capable of forming Z-DNA are untwisted allowing the gene-making of a cell to gain access to the DNA Helix.

The reader of this second extract expected the sentence to continue with a main clause; only on a second reading did he notice the comma between the second and third words; this was not the pre-modified noun group he had thought it was. Punctuation is important in understanding clause relations. In the first extract however, the writer has included no commas to help the reader, with the result that our subject construed the opening non-finite subordinate clause ending at *axioms*, rather than at *have*. The possibility of omitting the subordinating *that* (contact clauses) sometimes obscures the distinction between relativisation and subordination.

A further function of *that* also caused the following confusion:

> ... the born believer does not feel that intellectual discomfort and takes the phenomenon for granted.

In this case, the collocation of *feel that* led to the expectation of a subordinate object clause rather than a noun object preceded by a demonstrative adjective.

Word-class Confusions

In fact, the final example above leads to a type of miscue that, from our reader reports, deserves a section on its own. Many of the items quoted by our subjects

show an initial misinterpretation due to the similarities of form between words with varying grammatical functions. We quote a sequence of just four out of many other examples:

> for a relatively long time the learner *processes* the input in the target language in silence. (The verb at first read as a noun).
>
> Terms like "creativity" and "self-actualisation" have, at the present time at least, no adequate empirical referents. *Now,* it is quite true that we can define "creativity"... (Connector interpreted as time adverb, particularly in view of the time reference in the preceding sentence).
>
> The drug *clouds* the mind and reduces self control. (Verb read as a noun!)

And from the same text:

> Marihuana has long been a major problem *for* government narcotic squads, *for* the Indian hemp plant grows old in many areas. (*For* given the same meaning in both instances, conceived at first as some sort of enumeration).

Unlike Portuguese — the native language of our readers — and many other languages, English is less rich in derivational and inflectional affixes which indicate word class. This confusion becomes particularly critical when conjunctions are involved. It was seen in Section 2 that these are important elements in following arguments and yet — as the second and (particularly) fourth examples above show — the function of these forms is often potentially ambiguous. Other examples are *since, as, while, like* (construed as a verb or preposition), *thus* (conjunction or adverb), etc. (See Berman 1984 for further examples of the same problem.)

The problem with some of these conjunction/preposition/adverb confusions is that they cannot always be easily distinguished through syntactic analysis. Syntactic analysis can, however, resolve examples one and three above and thus some sort of parsing practice activity seems to be required in our ESP reading courses.

To summarise the major findings arising from our reading miscues study, then —the following items would appear to be strong candidates for inclusion in our Minimum Discourse Grammar: reference items, uses of the *-ing* form, subordinate clause marking and meaning, forms which belong to two or more classes, and ambiguous syntactic structure.

CONTRASTIVE CRITERIA

We shall not here enter the debate concerning the contrastive analysis hypothesis, but merely assume that points of contrast in the two language systems are potential points of difficulty.

Having said that, one point of policy in the Brazilian ESP Project is that it is more important to show the student points of similarity — i.e. what he already "knows" — rather than points of difference. It is now well established that previous knowledge is an important factor in understanding content; we have attempted to extend this principle to formal aspects of the text by emphasising similarities in discourse structure, cognate lexical items, etc. Thus students are shown that Portuguese and English academic texts have, as far as we have been able to determine, similar stages of development, both in the overall text and in text subsections. The 'moves' noted by Swales (1981), for example, in English article introductions are present in Portuguese with the same tense markings. Lower level units such as rhetorical functions of exemplification and comparison have overlapping markings: *for example* = *por exemplo, such as* = *tais como* and so on.

There are, however, a number of conjunctions/adverbs which can cause confusion due to a superficial similarity.

on the other hand $\overline{\neq}$ *por outro lado* (more frequently additive)

The positive and negative equation here represents the fact that *por outro lado* can have the adversative force of the English phrase, but more frequently in Portuguese has an additive meaning like *furthermore.* If students have a tendency to translate during their reading (as it cannot be denied that they do, particularly at difficult moments in the text) they may thus get themselves into difficulty here, as in the other cases now given below, where we use the same notational conventions:

once the process has begun ≠ *uma vez que* (= causal *since*)

all in all this was useful ≠ *com tudo* (= *however*)

whether they *be* indigenous *or* immigrants ≠ indiginos *ou seja* imigrantes (= *that is to say*)

At the level of sentence syntax we do not anticipate a great deal of difficulty. Portuguese has a more flexible word order than English, but the predominant tendency is for an SVO order. Thus, although a passive sentence typical of scientific discourse such as *3 types were found* would normally be rendered in Portuguese discourse as *Foram encontrados 3 tipos,* there would be little or no difficulty for the Brazilian reader of English.

Where there may be significant consequences, however, is to be found in cases where, in Portuguese, the writer can use extended subjects The principle of "end weight" can be maintained in such Portuguese sentences as:

> Foram utilizados 18 coelhos machos e 11 femeas, normais brancos, cruzamento de racas Gigante and Nova Zelandia de 3 a 6 meses de idade, peso de 2,100 a 4,500 kg.

English syntax, again on the principle of "end weight", could not place this extended subject before the verb and would possibly render the same meaning in a series of separate clauses:

> Normal white rabbits were used — 18 males and 11 females. They were cross-breeds of Giant and New Zealand strains of 3 to 6 months old, and weighing between 2,100 and 4,500 kg.

This likely consequence of differing Portuguese/English word-order flexibility therefore reinforces, from a contrastive point of view, some of the language items we have mentioned earlier in this paper — the need for the Brazilian reader to be familiar with punctuation devices, reference items and *-ing* forms.

The major problem for Brazilian readers of English is the structure of complex noun groups. As a general rule of thumb, one can present them with the mirror-image principle whereby:

The ^{1}*internal* ^{2}*combustion* ^{3}*engine*

becomes

^{3}*O motor* ^{2}*de combustão* ^{1}*interna*

My colleague, John Holmes, has devised a means of illustrating this to students through well-known international acronyms such as NATO = OTAN, IMF = FMI — the latter very topical for Brazilian readers!

The situation becomes more complex, however, with certain meaning relationships set up within the noun group, where *total oil consumption* really means *total consumption of oil,* and would be more familiar to Portuguese speaking readers in this form. What one can do in these cases, therefore, is to give students an insight into possible meaning relationships between elements in noun groups (see e.g. Williams 1984) against which they are able to match particular cases as they occur.

Ultimately one can return to the contrastive purpose of science realised through complex noun groups, as noted in our discussion of Popper earlier, in identifying concept (head word) and the nature of the refinement or modification of that concept (modifiers).

Thus, through this contrastive analysis, we have confirmed the need to give attention to some of the items already noted in other sections, notably conjunctions, punctuation, reference items, *-ing* forms and noun group modification.

LANGUAGE ITEMS AND READING

To return to the process aspect of our courses, it will be remembered that our aim is to improve our students' reading strategies in line with the sort of purposes they are

likely to put their reading to. We have, in regard to the latter, advocated three operational levels of comprehension: general or global, main points and detailed comprehension.

These are, of course, very fuzzy distinctions. They are also corrective; students have a tendency to treat any text — and not only a foreign language text, it would seem — as a detailed comprehension task. We can perhaps assume that they come to reading courses with detailed comprehension strategies in L1 fairly well developed, but it is at this level, of course, that the L2 presents the most problems and does not allow them to "cope". The first two levels of comprehension listed above thus seem a priority focus of attention in our courses.

In what might become some recommendations for grading the items we have established above, and assessing a course development from global to detailed and later to critical reading, the following very tentative links between language items and comprehension levels might be proposed.

General Comprehension:

Markers of negation and problems
Qualifiers as adverbs / verbs preceding 'claims'

Main points comprehension:

Conjunctions and logical connectors
Contrasting noun group modification
Comparative forms
Subordinate clause marking
Isomorphic items
Reference items

Detailed comprehension:

Morphological markers of word classes
Semantic relations / lexical cohesion
Parsing
Uses of the *-ing* form

No attempt has been made, it should be added, to put teaching points in order within each section.

CONCLUSIONS

The general interest of this paper, it is hoped, lies in the principles underlying our procedures rather than the items actually established. These principles, we believe, take into account the writer's purpose as part of the general purpose of science, the interpretative interactive role of the reader, and the language medium itself. In this

sense the language items are based on a sure foundation of discourse principles relevant, we believe, to the reading of scientific and academic literature.

NOTES

1. This is an extended version of a paper presented to the VIIth AILA Congress, Brussels, August 1984.
2. I am indebted to Tom Huckin of Carnegie-Mellon University, Pittsburgh, for introducing me to Toulmin's analysis and indicating its relevance to ESP teaching, during his Fulbright attachment to the National Project.

REFERENCES

Berman, R.A. (1984) Syntactic components of the foreign language reading process. *In* J.C. Alderson and A.H. Urquhart (Eds.) *Reading in a Foreign Language* London: Longman.

Deyes, A.F. (1985) The contrastive nature of scientific discourse. *DELTA* I (1 and 2), Catholic University of San Paulo.

Harré, R. (1960) *The Logic of the Sciences* London: Macmillan.

Hoey, M. (1983) *On the Surface of Discourse* London: George Allen and Unwin.

Popper, K. (1979) *The Growth of Scientific Knowledge* Klostermann.

Swales, J. (1981) *Aspects of Article Introductions* Aston University ESP Research Reports, No. 1.

Toulmin, S. (1983) *The Uses of Argument* Cambridge: Cambridge University Press.

Williams, R.C. (1984) A cognitive approach to English nominal compounds. *In* A.K. Pugh and J.M. Ulijn (Eds.) *Reading for Professional Purposes* London: Heinemann.